19BCE7346 VIT-AP UNIVERSITY **Taran**

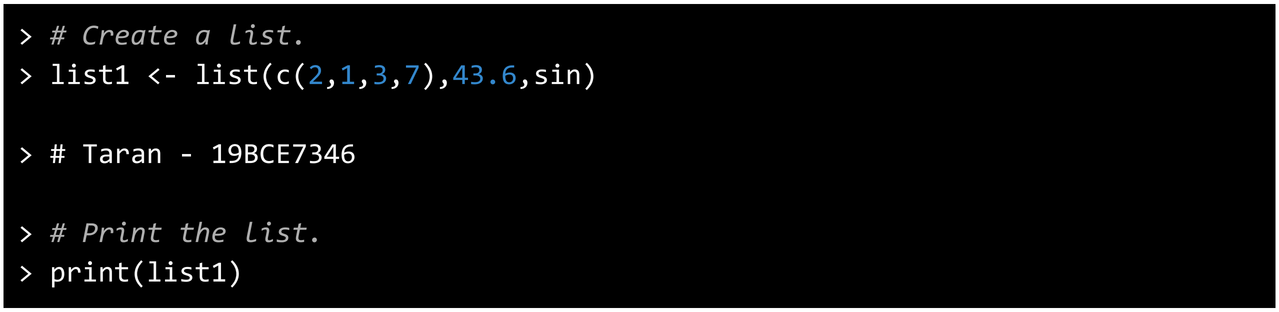
CSE- 4027 LAB-3 Assignment

Academic year: 2020-2021 **Semester:** WIN

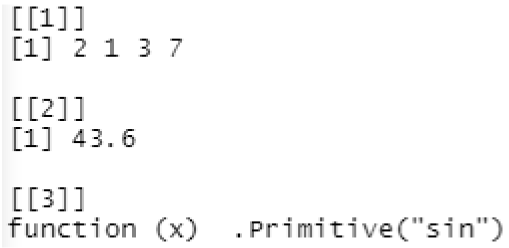
Faculty Name: Dr Karthikeyan Saminathan sir **Date:** 20 /10/2021

Student name: Taran Mamidala **Reg. no.:** 19BCE7346

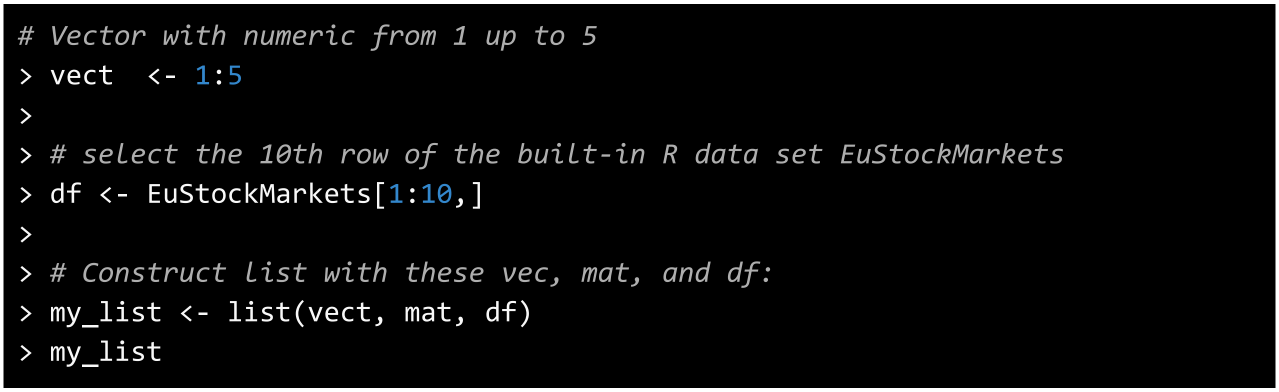
List



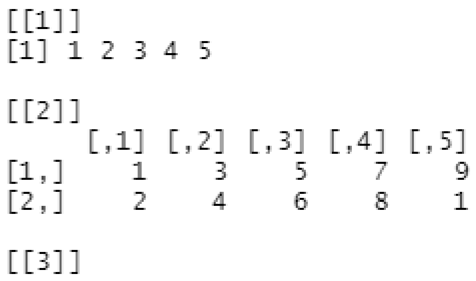
```
> # Create a list.
> list1 <- list(c(2,1,3,7),43.6,sin)

> # Taran - 19BCE7346

> # Print the list.
> print(list1)
```



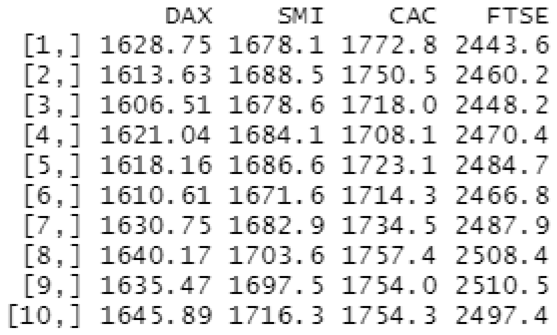
```
[[1]]
[1] 2 1 3 7

[[2]]
[1] 43.6

[[3]]
function (x)  .Primitive("sin")
```



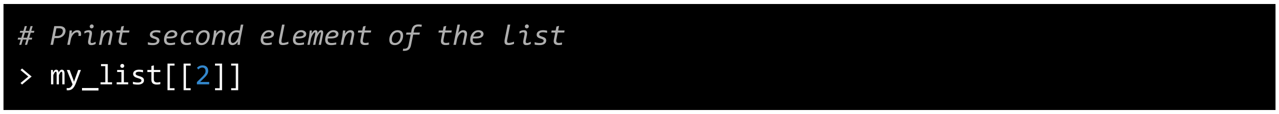
```
# Vector with numeric from 1 up to 5
> vect  <- 1:5
>
> # select the 10th row of the built-in R data set EuStockMarkets
> df <- EuStockMarkets[1:10,]
>
> # Construct list with these vec, mat, and df:
> my_list <- list(vect, mat, df)
> my_list
```



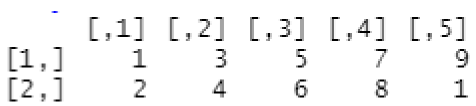
```
[[1]]
[1] 1 2 3 4 5

[[2]]
     [,1] [,2] [,3] [,4] [,5]
[1,]    1    3    5    7    9
[2,]    2    4    6    8    1

[[3]]
```



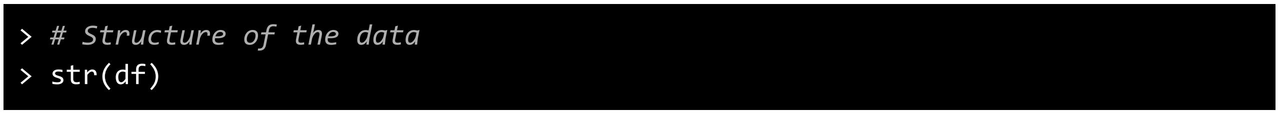
```
          DAX    SMI    CAC   FTSE
 [1,] 1628.75 1678.1 1772.8 2443.6
 [2,] 1613.63 1688.5 1750.5 2460.2
 [3,] 1606.51 1678.6 1718.0 2448.2
 [4,] 1621.04 1684.1 1708.1 2470.4
 [5,] 1618.16 1686.6 1723.1 2484.7
 [6,] 1610.61 1671.6 1714.3 2466.8
 [7,] 1630.75 1682.9 1734.5 2487.9
 [8,] 1640.17 1703.6 1757.4 2508.4
 [9,] 1635.47 1697.5 1754.0 2510.5
[10,] 1645.89 1716.3 1754.3 2497.4
```



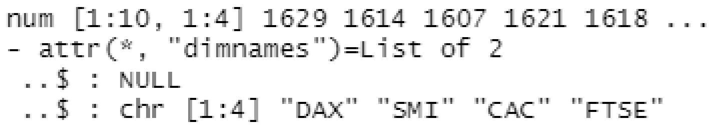
```
# Print second element of the list
> my_list[[2]]
```



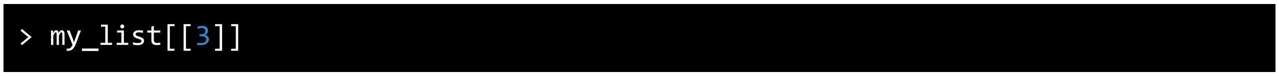
```
     [,1] [,2] [,3] [,4] [,5]
[1,]    1    3    5    7    9
[2,]    2    4    6    8    1
```



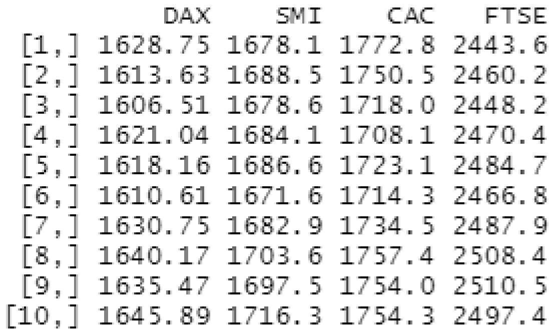
```
> # Structure of the data
> str(df)
```



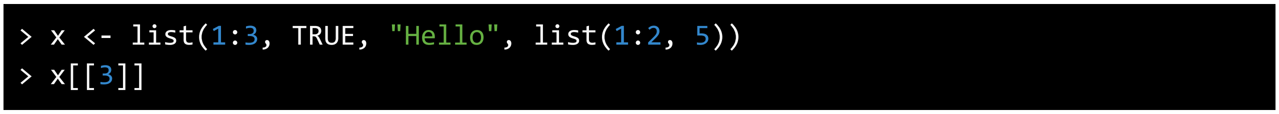
```
 num [1:10, 1:4] 1629 1614 1607 1621 1618 ...
 - attr(*, "dimnames")=List of 2
  ..$ : NULL
  ..$ : chr [1:4] "DAX" "SMI" "CAC" "FTSE"
```



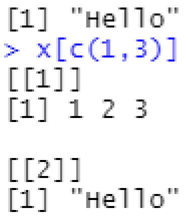
```
> my_list[[3]]
```



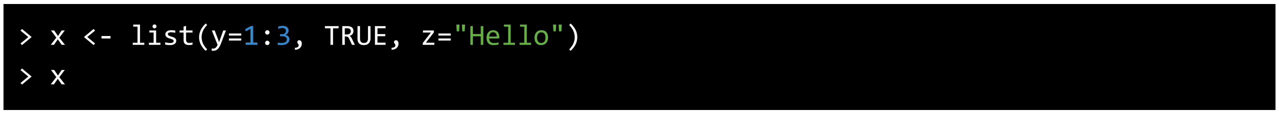
```
          DAX    SMI    CAC   FTSE
 [1,] 1628.75 1678.1 1772.8 2443.6
 [2,] 1613.63 1688.5 1750.5 2460.2
 [3,] 1606.51 1678.6 1718.0 2448.2
 [4,] 1621.04 1684.1 1708.1 2470.4
 [5,] 1618.16 1686.6 1723.1 2484.7
 [6,] 1610.61 1671.6 1714.3 2466.8
 [7,] 1630.75 1682.9 1734.5 2487.9
 [8,] 1640.17 1703.6 1757.4 2508.4
 [9,] 1635.47 1697.5 1754.0 2510.5
[10,] 1645.89 1716.3 1754.3 2497.4
```



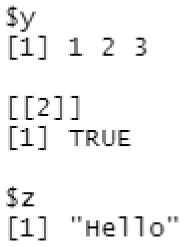
```
> x <- list(1:3, TRUE, "Hello", list(1:2, 5))
> x[[3]]
```



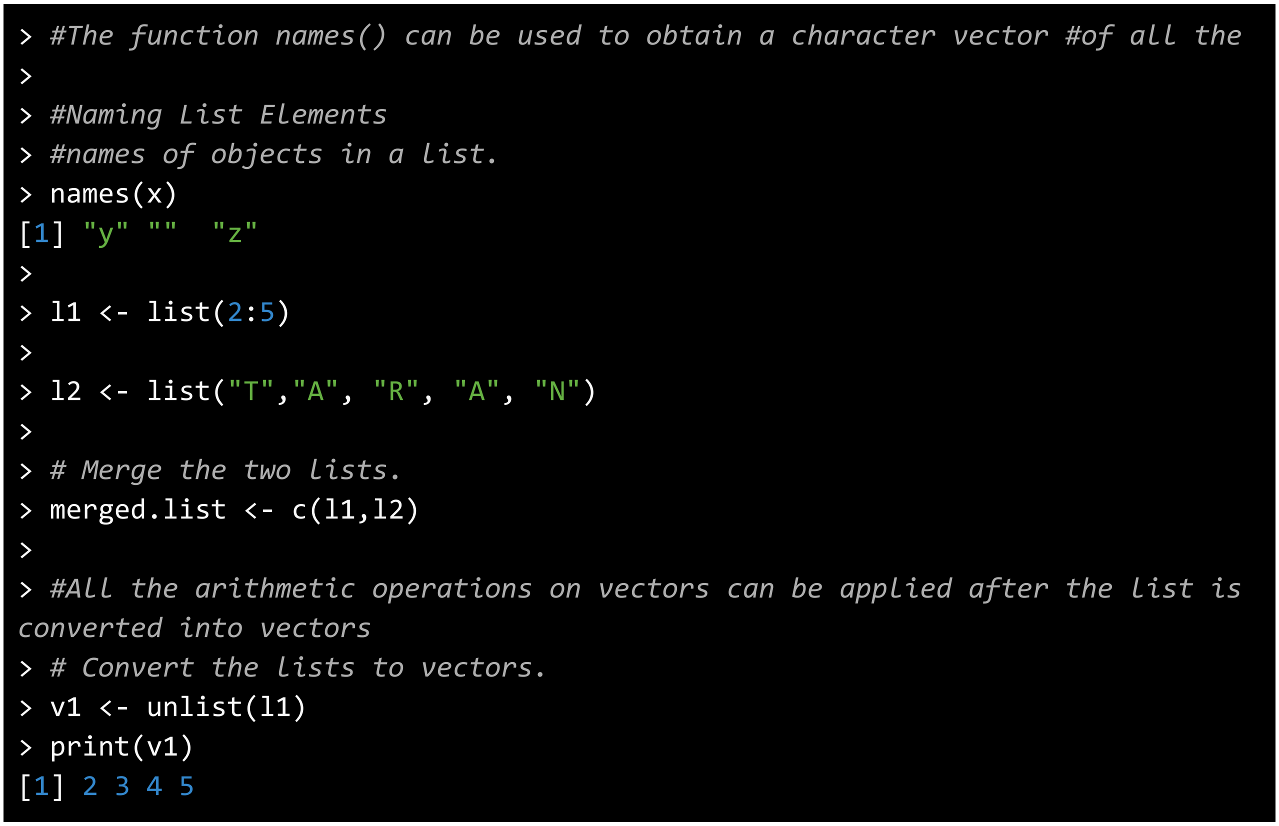
```
[1] "Hello"
> x[c(1,3)]
[[1]]
[1] 1 2 3

[[2]]
[1] "Hello"
```



```
> x <- list(y=1:3, TRUE, z="Hello")
> x
```

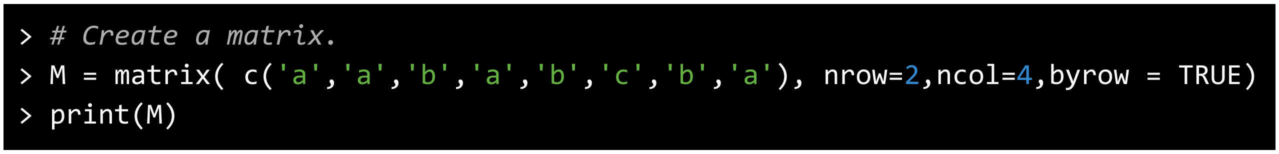


```
$y
[1] 1 2 3

[[2]]
[1] TRUE

$z
[1] "Hello"
```

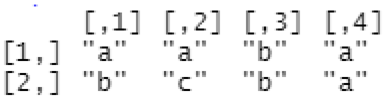


```
> #The function names() can be used to obtain a character vector #of all the
>
> #Naming List Elements
> #names of objects in a list.
> names(x)
[1] "y" ""  "z"
>
> l1 <- list(2:5)
>
> l2 <- list("T","A", "R", "A", "N")
>
> # Merge the two lists.
> merged.list <- c(l1,l2)
>
> #All the arithmetic operations on vectors can be applied after the list is
converted into vectors
> # Convert the lists to vectors.
> v1 <- unlist(l1)
> print(v1)
[1] 2 3 4 5
```

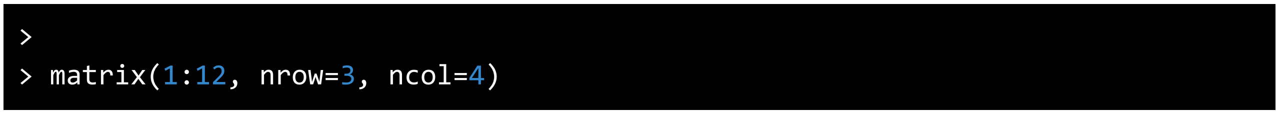
Matrices



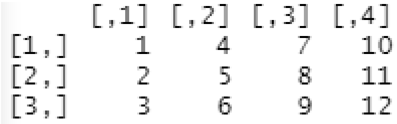
```
> # Create a matrix.
> M = matrix( c('a','a','b','a','b','c','b','a'), nrow=2,ncol=4,byrow = TRUE)
> print(M)
```



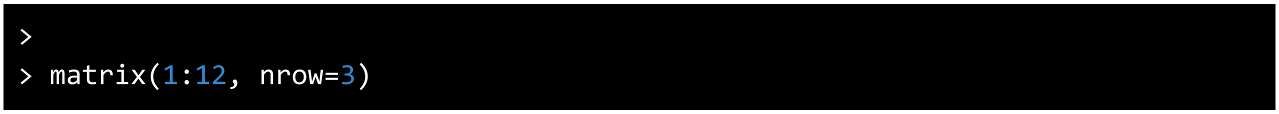
```
     [,1] [,2] [,3] [,4]
[1,] "a"  "a"  "b"  "a"
[2,] "b"  "c"  "b"  "a"
```



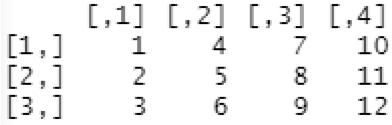
```
>
> matrix(1:12, nrow=3, ncol=4)
```



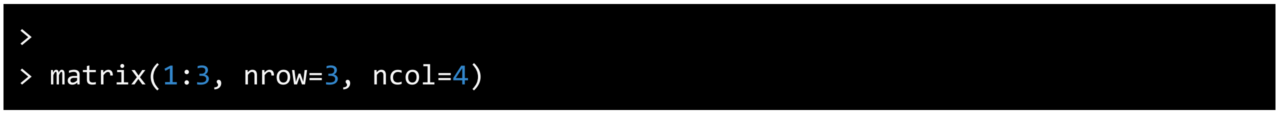
```
     [,1] [,2] [,3] [,4]
[1,]    1    4    7   10
[2,]    2    5    8   11
[3,]    3    6    9   12
```



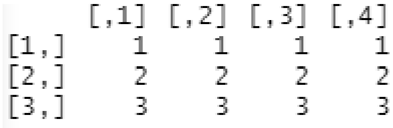
```
>
> matrix(1:12, nrow=3)
```



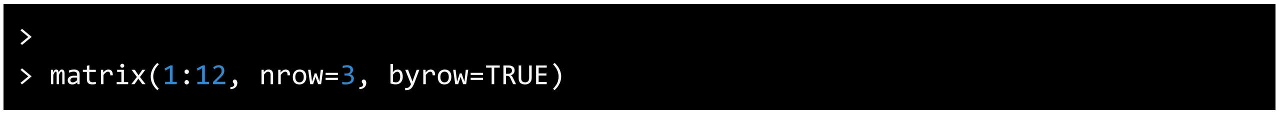
```
     [,1] [,2] [,3] [,4]
[1,]    1    4    7   10
[2,]    2    5    8   11
[3,]    3    6    9   12
```



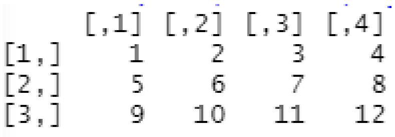
```
>
> matrix(1:3, nrow=3, ncol=4)
```



```
     [,1] [,2] [,3] [,4]
[1,]    1    1    1    1
[2,]    2    2    2    2
[3,]    3    3    3    3
```

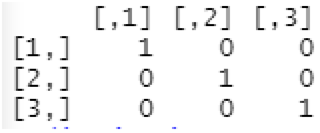


```
>
> matrix(1:12, nrow=3, byrow=TRUE)
```



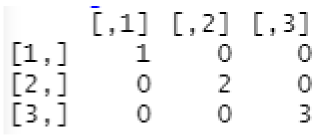
```
     [,1] [,2] [,3] [,4]
[1,]    1    2    3    4
[2,]    5    6    7    8
[3,]    9   10   11   12
```

```
>
> #functions for creating certain matrices
> diag(3)
```



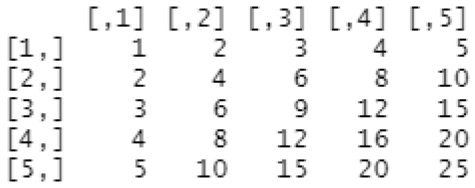
```
     [,1] [,2] [,3]
[1,]    1    0    0
[2,]    0    1    0
[3,]    0    0    1
```

```
> diag(1:3)
```



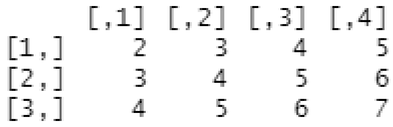
```
     [,1] [,2] [,3]
[1,]    1    0    0
[2,]    0    2    0
[3,]    0    0    3
```

```
>
> 1:5 %o% 1:5
```



```
     [,1] [,2] [,3] [,4] [,5]
[1,]    1    2    3    4    5
[2,]    2    4    6    8   10
[3,]    3    6    9   12   15
[4,]    4    8   12   16   20
[5,]    5   10   15   20   25
```

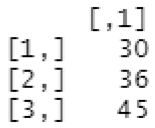
```
>
> outer(1:3, 1:4, "+")
```



```
     [,1] [,2] [,3] [,4]
[1,]    2    3    4    5
[2,]    3    4    5    6
[3,]    4    5    6    7
```

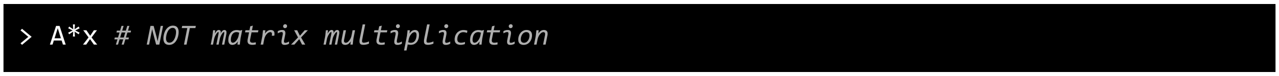
```
> A <- matrix(c(1:8,10), 3, 3)
> x <- c(1,2,3)
```

```
> A %*% x # matrix multiplication
```

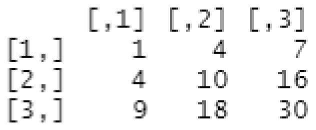


```
      [,1]
[1,]    30
[2,]    36
[3,]    45
```

```
>
```

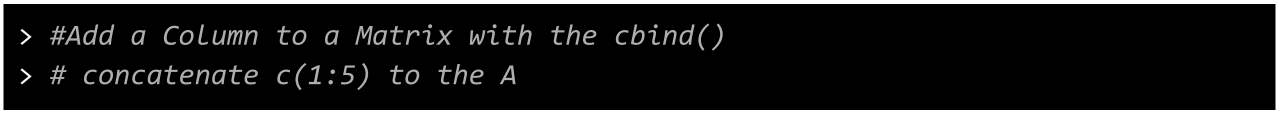


```
> A*x # NOT matrix multiplication
```

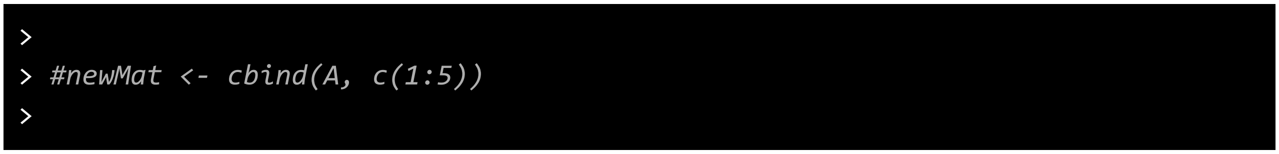


```
     [,1] [,2] [,3]
[1,]    1    4    7
[2,]    4   10   16
[3,]    9   18   30
```

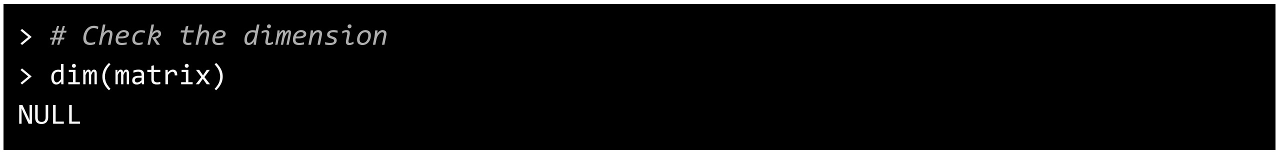
```
>
```



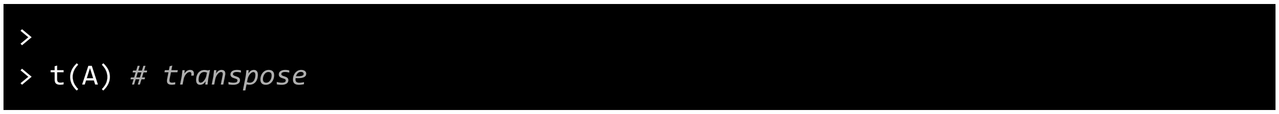
```
> #Add a Column to a Matrix with the cbind()
> # concatenate c(1:5) to the A
```



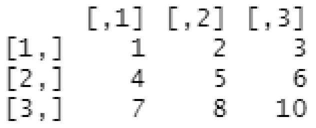
```
>
> #newMat <- cbind(A, c(1:5))
>
```



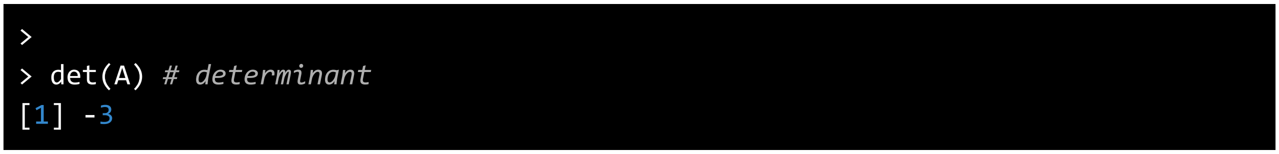
```
> # Check the dimension
> dim(matrix)
NULL
```



```
>
> t(A) # transpose
```

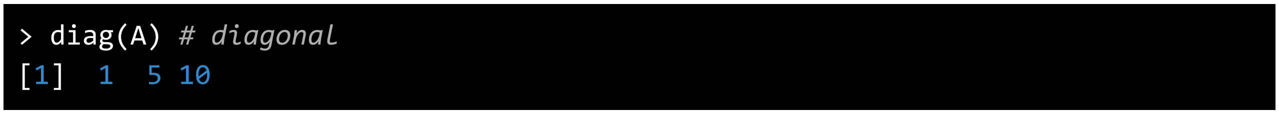


```
     [,1] [,2] [,3]
[1,]    1    2    3
[2,]    4    5    6
[3,]    7    8   10
```

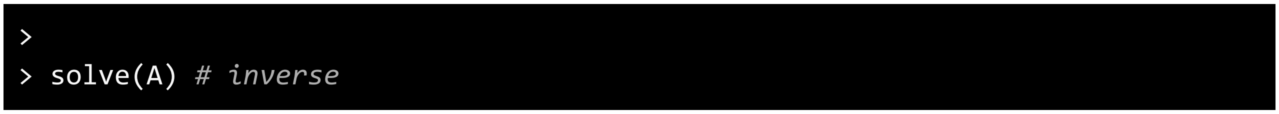


```
>
> det(A) # determinant
[1] -3
```

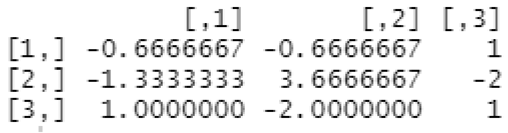
```
>
```



```
> diag(A) # diagonal
[1]  1  5 10
```

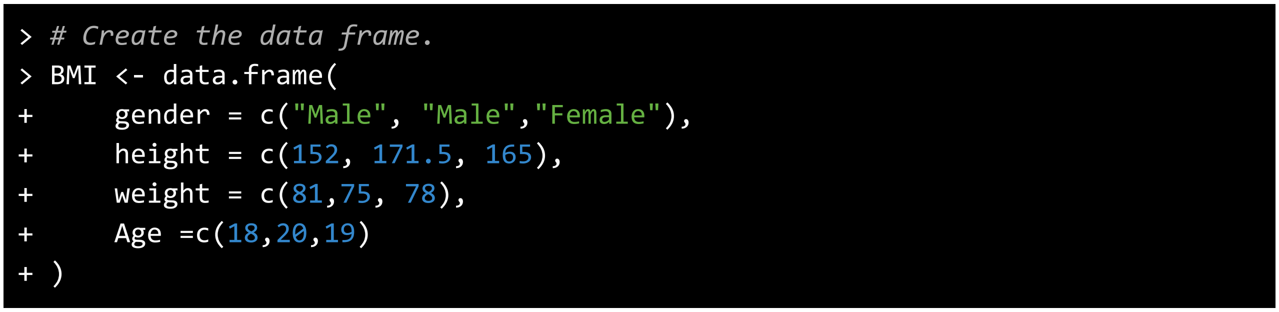


```
>
> solve(A) # inverse
```

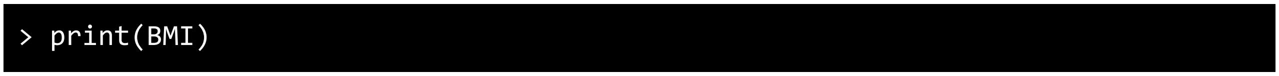


```
           [,1]       [,2] [,3]
[1,] -0.6666667 -0.6666667    1
[2,] -1.3333333  3.6666667   -2
[3,]  1.0000000 -2.0000000    1
```

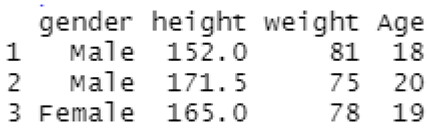
Dataframe



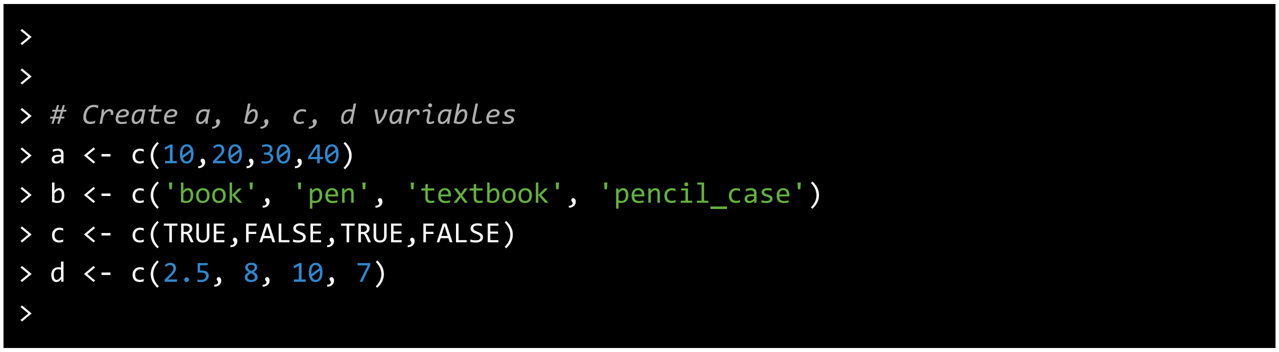
```
> # Create the data frame.
> BMI <- data.frame(
+     gender = c("Male", "Male","Female"),
+     height = c(152, 171.5, 165),
+     weight = c(81,75, 78),
+     Age =c(18,20,19)
+ )
```



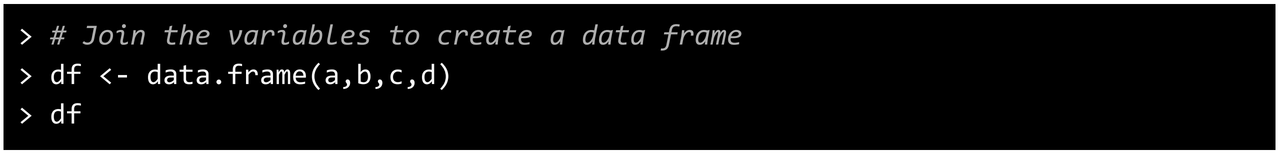
```
> print(BMI)
```



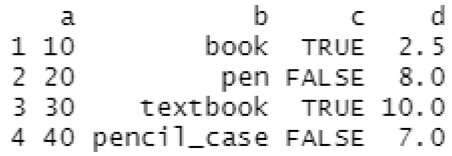
```
  gender height weight Age
1   Male  152.0     81  18
2   Male  171.5     75  20
3 Female  165.0     78  19
```



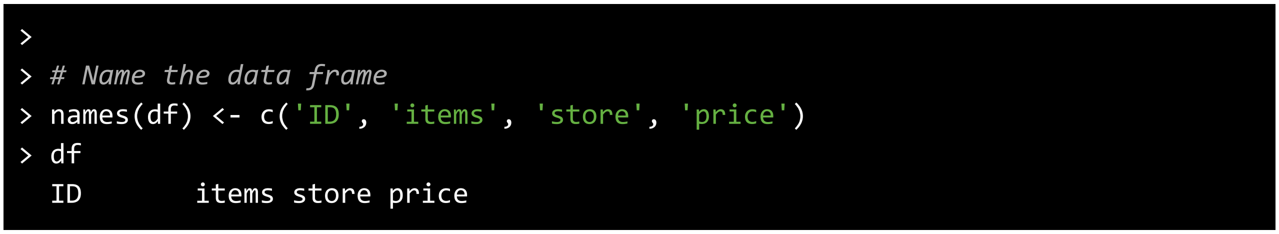
```
>
>
> # Create a, b, c, d variables
> a <- c(10,20,30,40)
> b <- c('book', 'pen', 'textbook', 'pencil_case')
> c <- c(TRUE,FALSE,TRUE,FALSE)
> d <- c(2.5, 8, 10, 7)
>
```



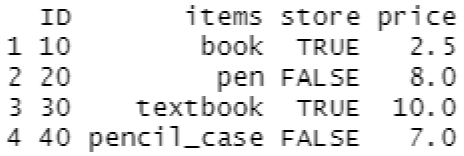
```
> # Join the variables to create a data frame
> df <- data.frame(a,b,c,d)
> df
```



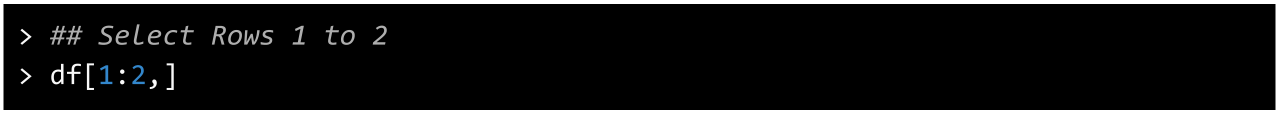
```
   a           b     c    d
1 10        book  TRUE  2.5
2 20         pen FALSE  8.0
3 30    textbook  TRUE 10.0
4 40 pencil_case FALSE  7.0
```



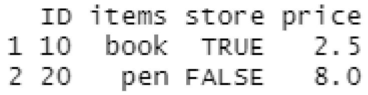
```
>
> # Name the data frame
> names(df) <- c('ID', 'items', 'store', 'price')
> df
  ID       items store price
```



```
  ID       items store price
1 10        book  TRUE   2.5
2 20         pen FALSE   8.0
3 30    textbook  TRUE  10.0
4 40 pencil_case FALSE   7.0
```

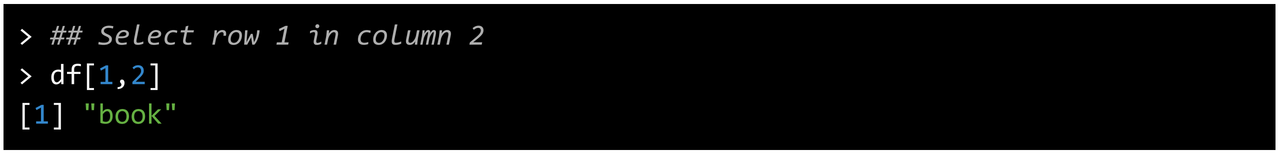


```
> ## Select Rows 1 to 2
> df[1:2,]
```

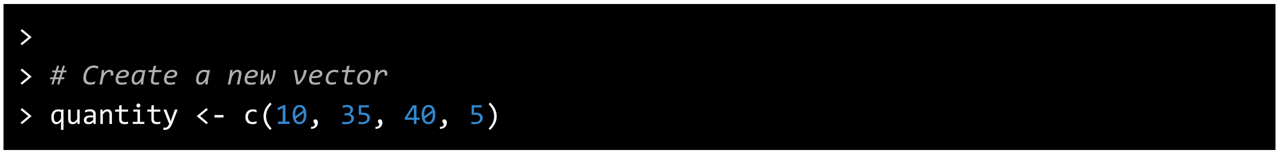


```
  ID items store price
1 10  book  TRUE   2.5
2 20   pen FALSE   8.0
```

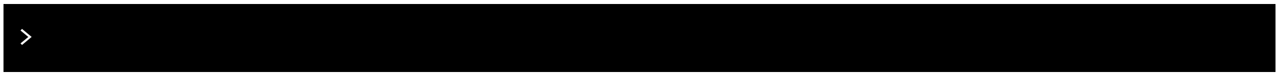
```
>
```



```
> ## Select row 1 in column 2
> df[1,2]
[1] "book"
```

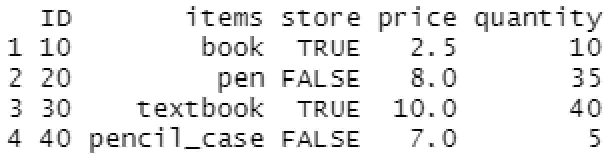


```
>
> # Create a new vector
> quantity <- c(10, 35, 40, 5)
```



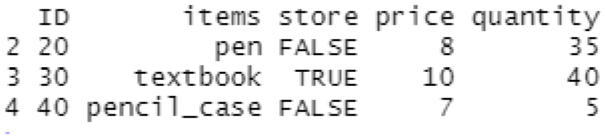
```
>
```

```
> # Add `quantity` to the `df` data frame
> df$quantity <- quantity
> df
```



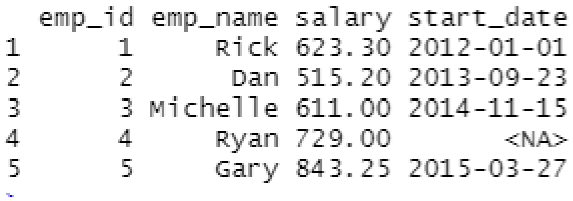
```
  ID        items store price quantity
1 10         book  TRUE   2.5       10
2 20          pen FALSE   8.0       35
3 30     textbook  TRUE  10.0       40
4 40 pencil_case FALSE   7.0        5
```

```
>
> # Select price above 5
> subset(df, subset = price > 5)
```



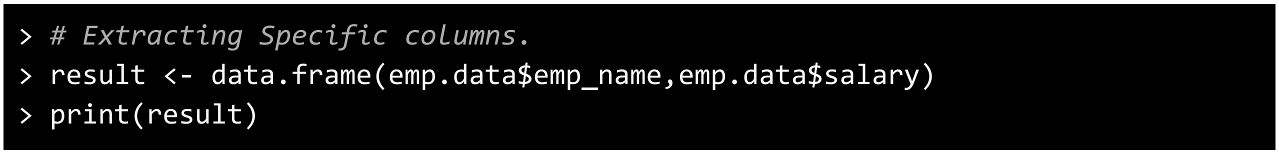
```
  ID        items store price quantity
2 20          pen FALSE     8       35
3 30     textbook  TRUE    10       40
4 40 pencil_case FALSE     7        5
```

```
>
>
> # Create the data frame.
> emp.data <- data.frame(
+     emp_id = c (1:5),
+     emp_name = c("Rick","Dan","Michelle","Ryan","Gary"),
+     salary = c(623.3,515.2,611.0,729.0,843.25),
+     start_date = as.Date(c("2012-01-01", "2013-09-23", "2014-11-15",
"2014-05-
+ 11",
+                              "2015-03-27")),
+     stringsAsFactors = FALSE
+ )# Print the data frame.
> print(emp.data)
```

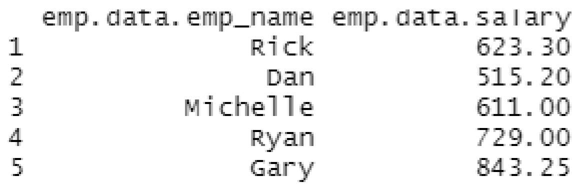


```
  emp_id emp_name salary start_date
1      1     Rick 623.30 2012-01-01
2      2      Dan 515.20 2013-09-23
3      3 Michelle 611.00 2014-11-15
4      4     Ryan 729.00       <NA>
5      5     Gary 843.25 2015-03-27
```

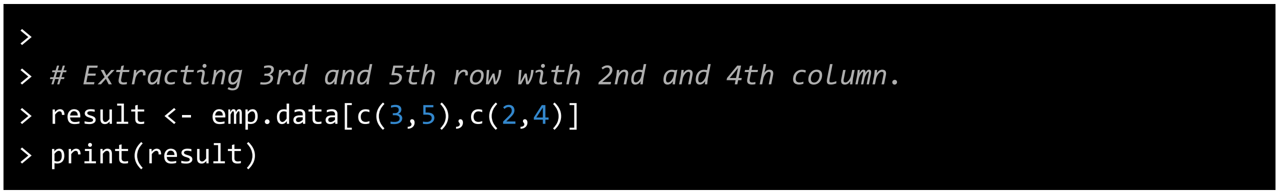
```
>
```



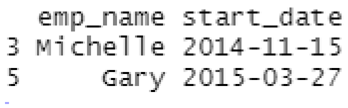
```
> # Extracting Specific columns.
> result <- data.frame(emp.data$emp_name,emp.data$salary)
> print(result)
```



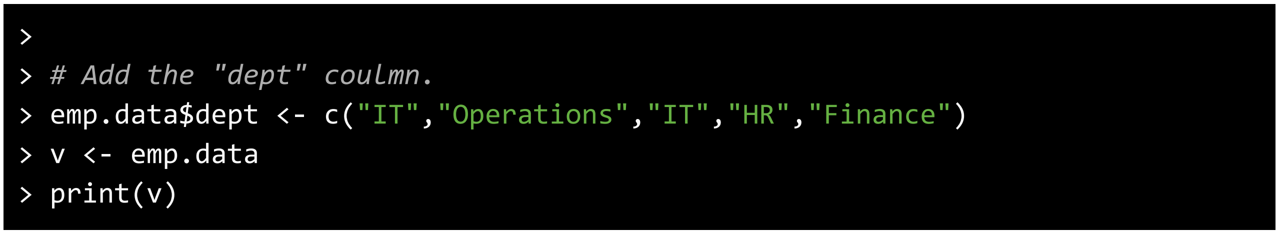
```
  emp.data.emp_name emp.data.salary
1              Rick          623.30
2               Dan          515.20
3          Michelle          611.00
4              Ryan          729.00
5              Gary          843.25
```



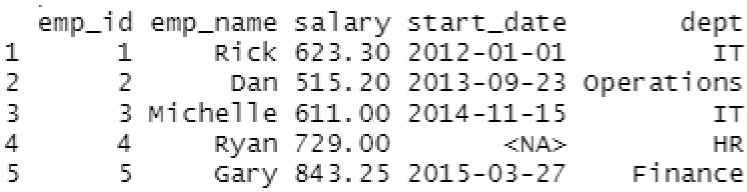
```
>
> # Extracting 3rd and 5th row with 2nd and 4th column.
> result <- emp.data[c(3,5),c(2,4)]
> print(result)
```



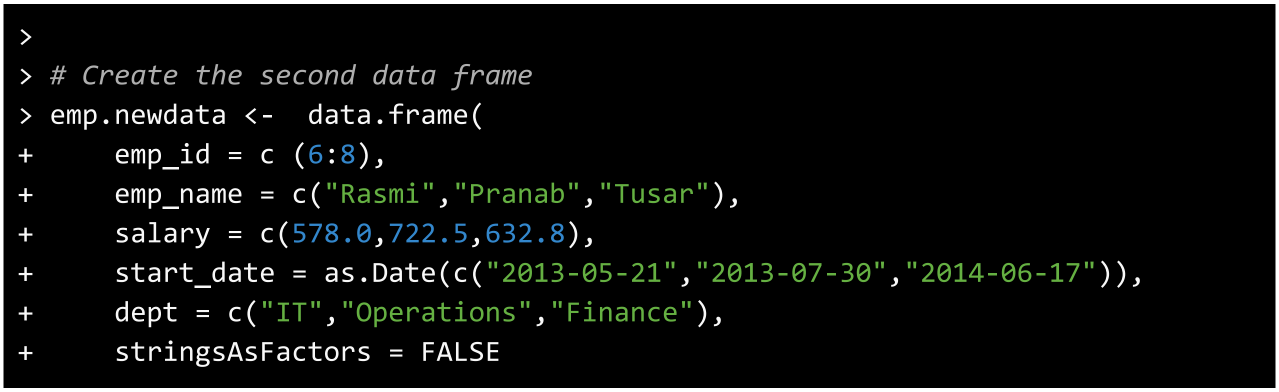
```
  emp_name start_date
3 Michelle 2014-11-15
5     Gary 2015-03-27
```



```
>
> # Add the "dept" coulmn.
> emp.data$dept <- c("IT","Operations","IT","HR","Finance")
> v <- emp.data
> print(v)
```

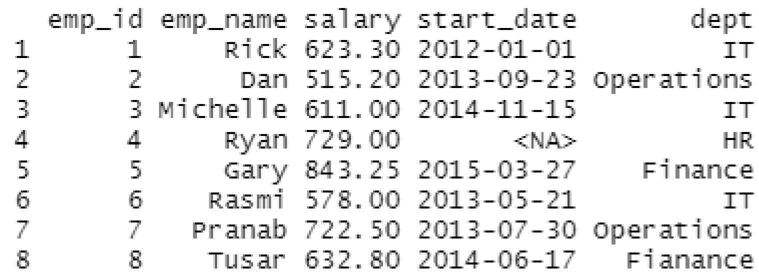


```
  emp_id emp_name salary start_date       dept
1      1     Rick 623.30 2012-01-01         IT
2      2      Dan 515.20 2013-09-23 Operations
3      3 Michelle 611.00 2014-11-15         IT
4      4     Ryan 729.00       <NA>         HR
5      5     Gary 843.25 2015-03-27    Finance
```



```
>
> # Create the second data frame
> emp.newdata <-  data.frame(
+     emp_id = c (6:8),
+     emp_name = c("Rasmi","Pranab","Tusar"),
+     salary = c(578.0,722.5,632.8),
+     start_date = as.Date(c("2013-05-21","2013-07-30","2014-06-17")),
+     dept = c("IT","Operations","Finance"),
+     stringsAsFactors = FALSE
+ )
```

```
>
> # Bind the two data frames.
> emp.finaldata <- rbind(emp.data,emp.newdata)
> print(emp.finaldata)
```

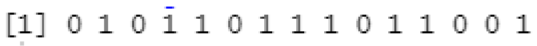


```
  emp_id emp_name salary start_date       dept
1      1     Rick 623.30 2012-01-01         IT
2      2      Dan 515.20 2013-09-23 Operations
3      3 Michelle 611.00 2014-11-15         IT
4      4     Ryan 729.00       <NA>         HR
5      5     Gary 843.25 2015-03-27    Finance
6      6    Rasmi 578.00 2013-05-21         IT
7      7   Pranab 722.50 2013-07-30 Operations
8      8    Tusar 632.80 2014-06-17   Fianance
```

```
>
> df2 <- data.frame(a = seq(1,16,by=2), b = LETTERS[1:8], x= month.abb[1:8],
y = sample(10:20,8, replace = TRUE), z=letters[1:8])
>
```

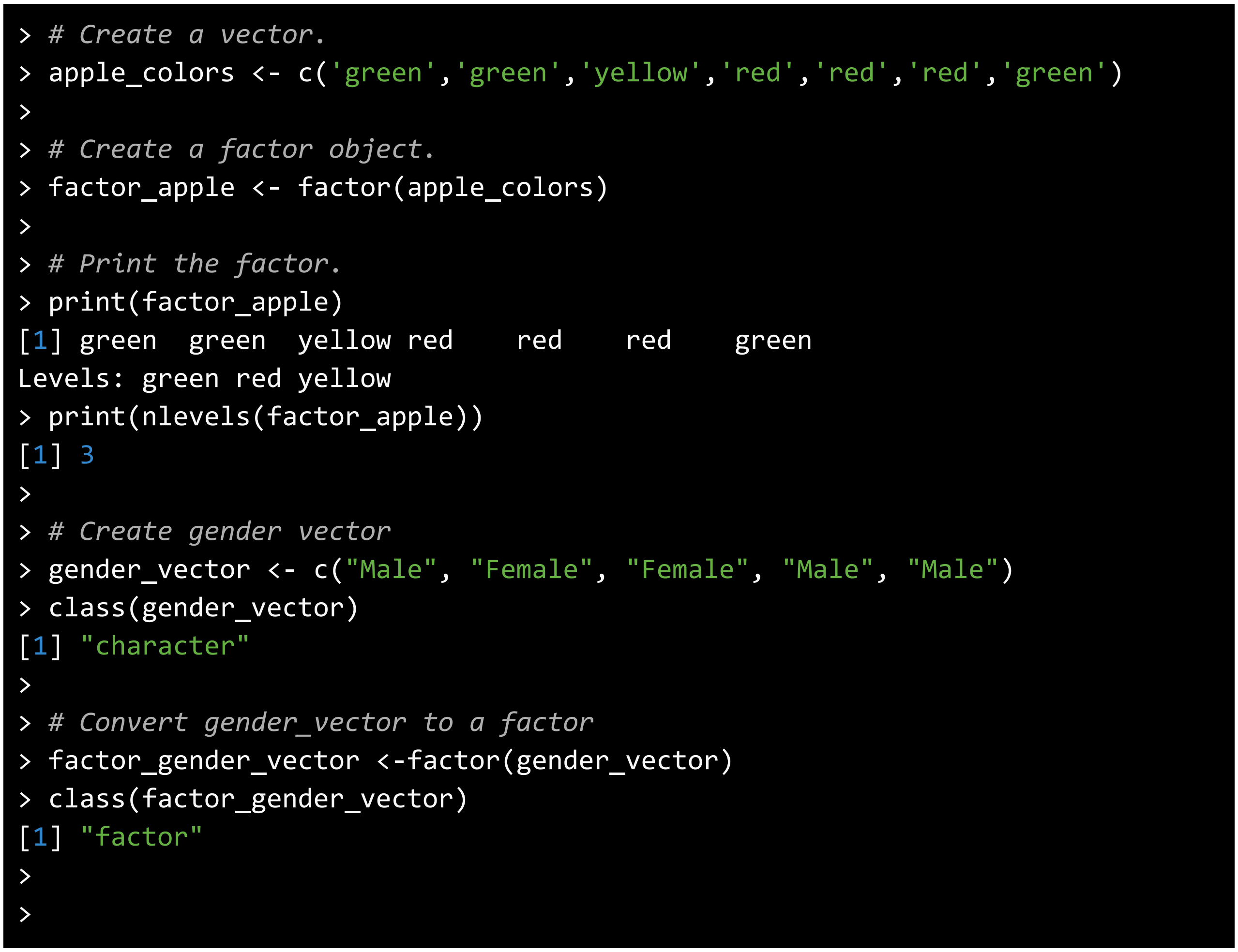
```
> #Create numeric grouping variable
> df3 = data.frame(X = sample(1:3, 15, replace = TRUE))
>
> #Random Numbers with mean 0 and std. dev 1
> set.seed(1)
> df4 <- data.frame(Y = rnorm(15), Z = ceiling(rnorm(15)))
>
```

```
> #Create binary variable (0/1)
> set.seed(1)
> ifelse(sign(rnorm(15))==-1,0,1)
```



```
[1] 0 1 0 1 1 0 1 1 1 0 1 1 0 0 1
```

Factor



```
> # Create a vector.
> apple_colors <- c('green','green','yellow','red','red','red','green')
>
> # Create a factor object.
> factor_apple <- factor(apple_colors)
>
> # Print the factor.
> print(factor_apple)
[1] green  green  yellow red    red    red    green
Levels: green red yellow
> print(nlevels(factor_apple))
[1] 3
>
> # Create gender vector
> gender_vector <- c("Male", "Female", "Female", "Male", "Male")
> class(gender_vector)
[1] "character"
>
> # Convert gender_vector to a factor
> factor_gender_vector <-factor(gender_vector)
> class(factor_gender_vector)
[1] "factor"
>
>
```